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Dynamical Dzyaloshinsky-Moriya interaction in KCuF3

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Abstract

The spin dynamics of the prototypical quasi-one-dimensional antiferromagnetic Heisenberg spin S=1/2 chain KCuF3 is investigated by electron spin resonance spectroscopy. Our analysis shows that the peculiarities of the spin dynamics require a new dynamical form of the antisymmetric anisotropic spin-spin interaction. This dynamical Dzyaloshinsky-Moriya interaction is related to strong oscillations of the bridging fluorine ions perpendicular to the crystallographic c axis. This new mechanism allows us to resolve consistently the controversies in observation of the magnetic and structural properties of this orbitally ordered perovskite compound. © 2008 The American Physical Society.

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